SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-42

Name: South Island Lake **County (ies)**: Minnehaha, McCook
Legal Description: T104-R 52-Sec. 30; T 104-R 53-Sec 25
Location from nearest town: 10 miles west of Colton, SD

Dates of present survey: July 8-9, 2009
Dates of last survey: July 17-18, 2007

Primary Game Species	Other Species
Walleye	Northern Pike
Yellow Perch	Black Crappie
Channel Catfish	Green Sunfish
	Black Bullhead

PHYSICAL DATA

Surface Area: 91 acres **Watershed area**: No data
Maximum depth: 16 ft. **Mean depth**: No data
Lake elevation at time of survey (from field observations): 2 feet low
Date the latest contour map was prepared: 1997
Beneficial use classifications: (5) Warmwater semi-permanent fish propagation, (7) immersion recreation, (8) limited-contact recreation, (9) fish and wildlife propagation, recreation and stock watering.

Ownership of Lake and Adjacent Lakeshore Properties

Island Lake is divided by a county highway into North and South Island lakes. South Island Lake is not listed as meandered public water in the State of South Dakota Listing of Meandered Lakes. Approximately half the lake and western shoreline is owned by the South Dakota Department of Game, Fish and Parks (GFP). The remainder of the lake and shoreline is privately owned.

Fishing Access

Shore fishermen frequently park along the county road to fish. Boat access is limited to a muddy beach on the north shore.

Field Observations of Water Quality and Aquatic Vegetation

The Secchi depth in South Island Lake was 1.9 m (6 ft. 2.8 in). There were scattered beds of sago pondweed (*Potamogeton pectinatus*), clasping leaf pondweed (*Potamogeton richardsoni*) cattail (Ty*phus spp.)* and bulrush (*Scirpus spp.*) along some of the shore.

BIOLOGICAL DATA

Methods:

South Island Lake was sampled on July 8-9, 2009 with three overnight gill-net sets and five overnight trap-net sets. The trap nets are constructed with 19-mm-bar-mesh (¾ in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads. The gill nets are 45.7 m long x 1.8 m deep (150 ft long x 6 ft deep) with one 7.6 m (25 ft) panel each of 13, 19, 25, 32, 38 and 51-mm-bar-mesh (½, ¾, 1, 1¼, 1½, and 2 in) monofilament netting.

Results and Discussion:

Gill Net Catch

Yellow perch (42.2%), black bullhead (39.0%), and walleye (16.2%) were the most common species sampled in the gill nets (Table 1). Other species sampled included, channel catfish, northern pike and white sucker. This is the first time gill nets were used to survey South Island Lake.

Table 1. Total catch from three overnight gill net sets at South Island, July 8-9, 2009.

Species	Number	Percent	CPUE[1]	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Yellow Perch	65	42.2	21.7	±10.9	--	62	22	90
Black Bullhead	60	39.0	20.0	±6.3	--	17	0	92
Walleye	25	16.2	8.3	±3.7	--	96	24	97
Channel Catfish	2	1.3	0.7	±0.9	--	--	--	--
Northern Pike	1	0.6	0.3	±0.4	--	--	--	--
White Sucker	1	0.6	0.3	±0.4	--	--	--	--

* 2009 was the first year gill nets were used

Table 2. Catch per unit effort by length category for various fish species captured with gill nets in South Island Lake, July 8-9, 2009.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Yellow Perch	--	21.7	8.3	8.7	4.7	21.7	±10.9
Black Bullhead	0.3	19.7	16.3	3.3	--	20.0	±6.3
Walleye	--	8.3	0.3	6.0	2.0	8.3	±3.7
Channel Catfish	--	0.7	--	--	0.7	0.7	±0.9
Northern Pike	--	0.3	--	0.3	--	0.3	±0.4
White Sucker	--	0.3	--	--	0.3	0.3	±0.4

[1] See Appendix A for definitions of CPUE, PSD, RSD-P, mean Wr and length categories.

Trap Net Catch

Black bullheads (97.2%) were the most common species sampled in the trap nets (Table 3). Yellow perch, green sunfish, black crappie, bluegill, golden shiner, walleye, and channel catfish were also sampled.

Table 3. Total catch from five overnight trap net sets at South Island Lake, Minnehaha County, July 8-9, 2009.

Species	Number	Percent	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	2107	97.2	421.4	±403.1	314.1	0	0	89
Yellow Perch	22	1.0	4.4	±2.8	9.2	23	14	100
Green Sunfish	16	0.7	3.2	±2.5	0.0	13	0	115
Black Crappie	8	0.4	1.6	±1.0	7.0	--	--	--
Bluegill	6	0.3	1.2	±1.5	0.2	--	--	--
Golden Shiner	5	0.2	1.0	±0.6	2.4	--	--	--
Walleye	3	0.1	0.6	±0.3	1.2	--	--	--
Channel Catfish	1	0.0	0.2	±0.3	0.6	--	--	--

*2 years (2005, 2007)

Table 4. Catch per unit effort by length category for various fish species captured with trap nets in South Island Lake, July 8-9, 2009.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Black Bullhead	375.0	46.4	46.4	--	--	421.4	±403.1
Yellow Perch	--	4.4	3.4	0.8	0.2	4.4	±2.8
Green Sunfish	--	2.8	0.4	--	--	3.2	±2.5
Black Crappie	1.4	0.2	--	--	0.2	1.6	±1.0
Bluegill	--	1.2	0.2	1.0	--	1.2	±1.5
Golden Shiner*						1.0	±0.6
Walleye	--	0.6	--	0.4	0.2	0.6	±0.3
Channel Catfish	--	0.2	--	--	0.2	0.2	±0.3

*No length categories established

All Species

Black bullhead trap net CPUE (Table 5) is currently exceeding our objective of no more than 100 per net. Adult walleyes (Table 6) have been stocked since 2007 to help control bullheads and provide angling opportunity and the lake currently contains an excellent population (Figure 2). South Island also has a good yellow perch population and anglers have reported some success last summer.

Table 5. Gill-net (GN) and trap-net (TN) CPUE for all fish species sampled in South Island Lake, Minnehaha County, 2001-2009.

Species	2001	2002	2003	2004	2005	2006	2007	2008	2009
GOS (GN)									
GOS (TN)									1.0
WHS (GN)									0.3
WHS (TN)									
BLB (GN)									20.0
BLB (TN)					358.0		270.2		421.4
CCF (GN)									0.7
CCF (TN)							1.2		0.2
NOP (GN)									0.3
NOP (TN)					3.8		1.0		
GSF (GN)									
GSF (TN)					0.2				3.2
BLG (GN)									
BLG (TN)							0.2		1.2
BLC (GN)									
BLC (TN)					0.6		13.4		1.6
YEP (GN)									21.7
YEP (TN)					0.2		18.2		4.4
WAE (GN)									8.3
WAE (TN)					1.2		1.2		0.6

GOS (Golden Shiner), WHS (White Sucker), BLB (Black Bullhead), CCF (Channel Catfish), NOP (Northern Pike), GSF (Green Sunfish), BLG (Bluegill), BLC (Black Crappie), YEP (Yellow Perch), WAE (Walleye)

MANAGEMENT RECOMMENDATIONS

1. Reduce black bullhead abundance by commercial fishing, Department removal projects and predator management.

2. Improve access for launching boats, shore fishing and vehicle parking.

3. Stock adult predators when available to provide angling opportunity and control bullhead recruitment.

4. Conduct occasional lake surveys to monitor the fishery.

Table 6. Stocking record for South Island Lake, Minnehaha County, 1991-2009.

Year	Number	Species	Size
2005	532	Northern Pike	Adult
2006	142	Channel Catfish	Adult
2007	365	Walleye	Adult
	452	Walleye	Juvenile
	200	Yellow Perch	Fingerling
2008	106	Walleye	Adult
2009	743	Walleye	Adult

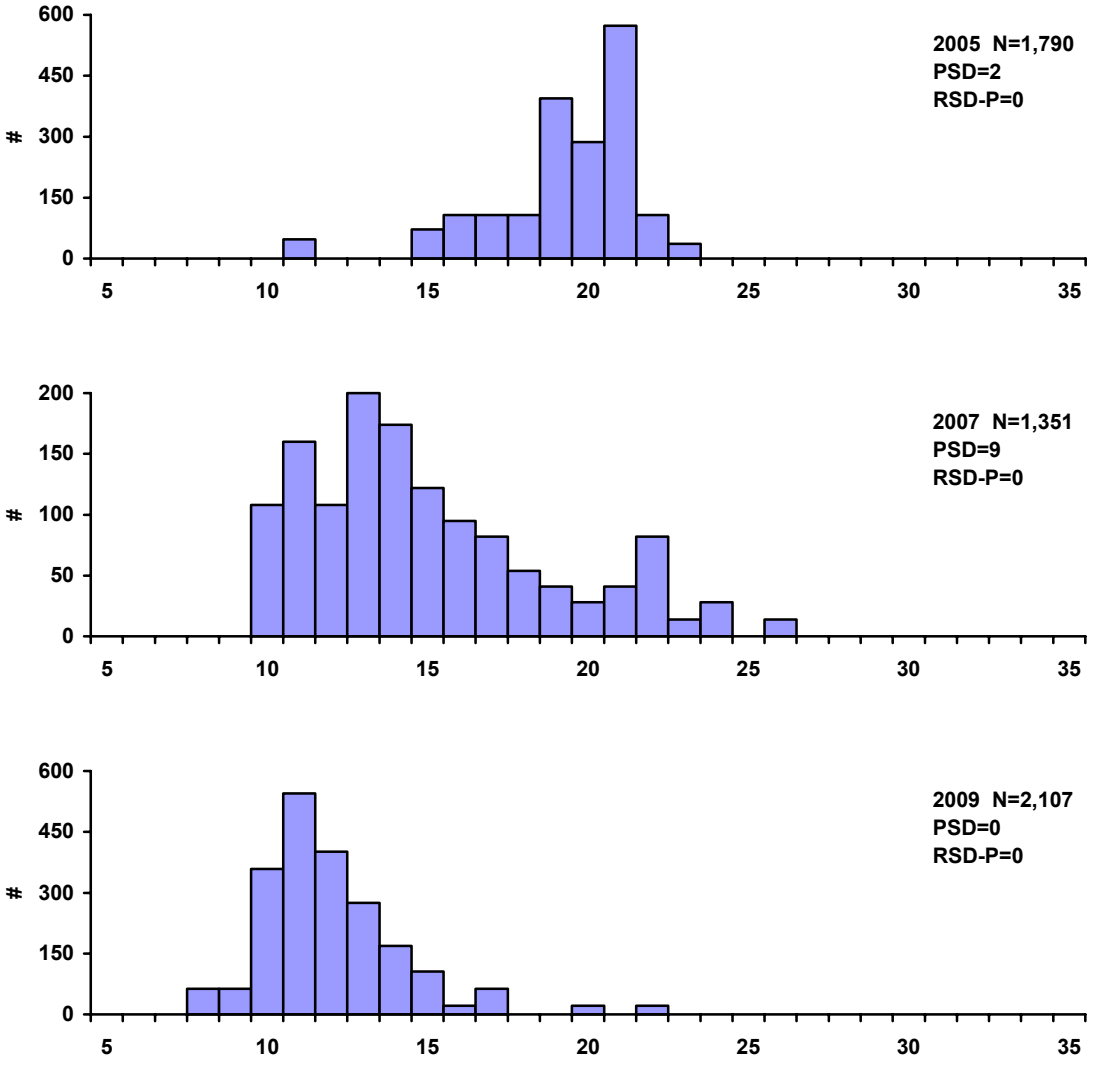

Figure 1. Length frequency histograms for black bullheads sampled with trap nets in South Island Lake, Minnehaha County, 2005, 2007, and 2009.

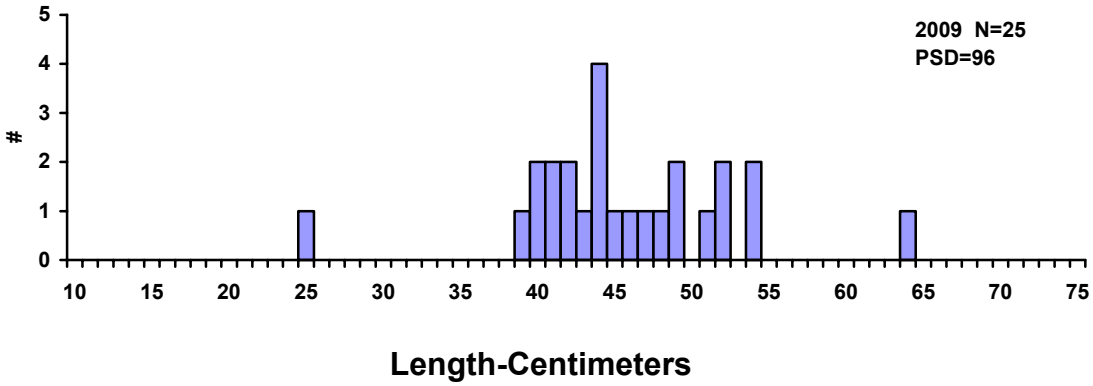

Figure 2. Length frequency histograms for walleye sampled with gill nets in South Island Lake, Minnehaha County, 2009.

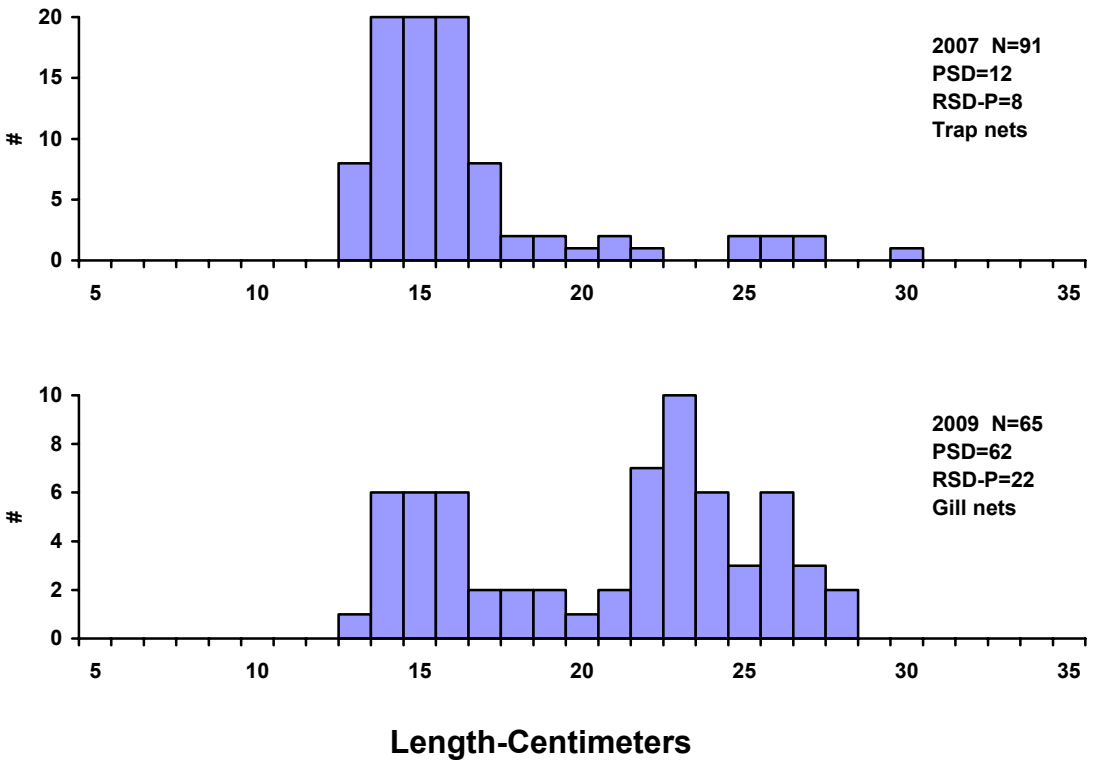

Figure 3. Length frequency histograms for yellow perch sampled with trap nets or gill nets in South Island Lake, Minnehaha County, 2007, and 2009.

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch Per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill-net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$PSD = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the following formula:

$$RSD\text{-}P = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters.

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25	38	51	63	76
Sauger	20	30	38	51	63
Yellow perch	13	20	25	30	38
Black crappie	13	20	25	30	38
White crappie	13	20	25	30	38
Bluegill	8	15	20	25	30
Largemouth bass	20	30	38	51	63
Smallmouth bass	18	28	35	43	51
Northern pike	35	53	71	86	112
Channel catfish	28	41	61	71	91
Black bullhead	15	23	30	38	46
Common carp	28	41	53	66	84
Bigmouth buffalo	28	41	53	66	84
Smallmouth buffalo	28	41	53	66	84

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.